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| APPLICATION NO.                    | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------------------|-------------|----------------------|---------------------|------------------|
| 09/972,608                         | 10/05/2001  | Vladimir V. Voronkov | 985401/23401        | 4591             |
| 321                                | 7590        | 12/23/2003           | EXAMINER            |                  |
| SENNIGER POWERS LEAVITT AND ROEDEL |             |                      | STEIN, STEPHEN J    |                  |
| ONE METROPOLITAN SQUARE            |             |                      | ART UNIT            |                  |
| 16TH FLOOR                         |             |                      | PAPER NUMBER        |                  |
| ST LOUIS, MO 63102                 |             |                      | 1775                |                  |

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/972,608

Applicant(s)

VORONKOV ET AL.

Examiner

Stephen J Stein

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3,4,9,11,13,15,17,19,20,23,24,28-34,37-43 and 46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3,4,9-11,13,15,17,19,20,23,24,28-34,37-43 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 01/09/2002. 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicants' election of Group II in the Applicants' preliminary amendment filed October 14, 2003 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 3, 4, 20, 28, 29, 37-41 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,919,302 (Falster '302).

Falster '302 teaches a single crystal silicon ingot having seed cone, an end cone, and a lateral surface with the radius extending from a central axis of the ingot to the lateral surface (See Figure 5). The reference further teaches that the ingot has a constant diameter with multiple asymmetrical regions running along the axis with one region in which vacancies are the predominant intrinsic point defect and two regions in which interstitials are the predominant intrinsic point defect (See figure 14 and col. 23, lines 13-30). Falster '302 still further teaches that the vacancy dominant region is separated by the two interstitial dominant regions which are substantially free of agglomerated defects (See Figure 14 and col. 12, lines 6-10). The reference further teaches a diameter of the ingot is 300mm (radius of the constant diameter = 150mm) (col.

21, lines 43-65). The reference further teaches that the ingot has a length of 700mm (See Figure 14). The reference finally teaches that that the region in which vacancies are predominant intrinsic point defect has a radius which is at least 90% of the radius of the constant diameter of the ingot (See Figure 14) and that each of the regions in where silicon self interstitials have a length which is less than twice the radius of the constant diameter of the ingot (See Figure 14).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9, 11, 13, 15, 17, 19, 22, 24, 30, 30-34, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Falster 302'.

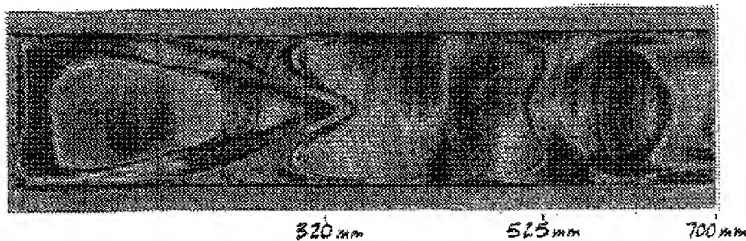
As stated above, Falster '302 teaches a single crystal silicon ingot having seed cone, an end cone, and a lateral surface with the 150mm radius extending from a central axis of the ingot to the lateral surface and multiple asymmetrical regions running along the axis with one region in which vacancies are the predominant intrinsic point defect and two regions in which interstitials are the predominant intrinsic point defect wherein the vacancy dominant region separates the two interstitial dominant regions which are substantially free of agglomerated defects.

Although Falster fails to specifically claim the claimed number of vacancy dominated regions  $N$ , the claimed length  $L$  of the ingot, and the claimed ratio  $L_{vac}/L_{int}$ , (result effective variables) absent a showing of criticality with respect to these values in would have been obvious to a person of ordinary skill in the art to maximize the length and number of vacancy dominated

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regions of the wafer in order create more usable area for creating silicon wafers. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Figure 14.



### *Conclusion*

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Stein whose telephone number is (703) 305-0583 ((**572-272-1544 after Jan 1, 2004**)). The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:00 p.m. If the attempts to reach the examiner are unsuccessful, the examiner's supervisor, Deborah Jones can be reached by dialing (703) 308-3822. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group Receptionist whose phone number is (703) 308-0661. The fax phone number for this group is (703) 872-9306.

December 4, 2003

*Stephen J. Stein*  
Stephen J. Stein  
Primary Examiner  
Art Unit 1775